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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/508,858

09/24/2004

Masatoshi Hotta

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EXAMINER

MERKLING, MATTHEW J

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

08/14/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/508,858	Applicant(s) HOTTA ET AL.	
	Examiner MATTHEW J. MERKLING	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/6/09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/5/09 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 1, Applicant added the limitation "...the flange is provided so that the distance from the flange to the bottom of the reactor is about 190mm or more". In the originally filed disclosure, Applicant discloses a distance between the flange and the bottom of the reactor to be

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approximately 190mm (see specification, page 17 lines 10-14 and page 18 lines 6-9), but does not disclose the distance to be more than 190mm, as claimed.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1, 2, 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable in view of Christensen (US 3,041,151) in view of Clyde (US 4,420,462).

Regarding claims 1, 2 and 6, Christensen discloses a reaction apparatus comprising a heat exchanger (shell (6), tubes (21)) and a reactor (catalyst bed, (11)) with a heater (electric heater, (7), col. 4 lines 24-26)), which are enclosed in an outer casing (shell (1)), wherein the heat exchanger has a first (top of heat exchanger as depicted in Fig. 2) end and a second end (bottom of heat exchanger as depicted in Fig. 2) whereby the first end of the heat exchanger (6, 21) being connected to the reactor (11), and the second end of the heat exchanger (6, 21) and the bottom of the outer casing (45) being fixed to each other by a flange (28, see Fig. 2), and a double piping (see Fig. 2) having an inner tube (50) and an outer tube (which is connected to outlet 51) for introducing a gas to be treated through the inner pipe (49, col. 5 lines 5-9) and discharging the treated gas through the annular space, or outer pipe (see Fig. 2, col. 5 lines 33-39), such that the gas passes through the heat exchanger (after entering through 49, the gas enters into heat exchanger 6,21), the reactor (after exiting the heat exchanger, the gas travels to the reactor 11) and

the heat exchanger (after reactor gas travels back down to the heat exchanger 6,21) in this order during the process (see gas flow directions in Fig. 2).

Christensen teaches an outer casing with sidewalls and a ceiling (see Fig. 2 which clearly discloses sidewalls and a ceiling) but does not explicitly disclose an 'integrally formed' outer casing comprising side walls and a ceiling. Furthermore, Christensen teaches an apparatus which comprises a outer shell joined to a flange (45) to provide a seal, but does not disclose a sealing material on the flange.

Clyde also discloses a reaction apparatus comprising a heat exchanger (see abstract).

Clyde teaches reaction apparatus which comprises an outer casing comprised of sidewalls and a ceiling (see Fig. 2 which discloses a outer shell 112 which has a ceiling and sidewalls) in an integral configuration in order to facilitate removing the outer casing and either replacing catalyst or maintaining the heat exchanger tubes (col. 2 lines 42-49) and also teaches a sealing material (gasket 34) to seal reaction apparatus (col. 4 lines 29-37).

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the sidewalls and ceiling of modified Christensen into an integral piece of construction and seal the casing to the flange with a gasket (as taught by Clyde) for the purpose of facilitating reactor maintenance by making the outer shell easily removable while providing an effective seal during operation.

Furthermore, making several rigidly held pieces of an apparatus into an integral structure would have been obvious to one of ordinary skill in the art at the time of the invention as such a modification, where one piece of construction is used instead of the

structure Of Christensen, would be merely a matter of obvious engineering choice (see MPEP §2144.04(V)(B)).

In addition, Christensen does not explicitly disclose the size of said reaction apparatus. In particular, Christensen does not disclose that the distance from the flange (45) to the bottom end of the reactor is about 190mm. However, according to Fig. 2, Christensen does disclose a considerable distance between the flange (45) and the bottom of the reactor (11). As such, the distance between these two points is directly related to the size of the reaction apparatus and therefore the desired throughput of the reactor. In other words, the distance between the bottom of the reactor and the flange is not considered to confer patentability to the claims. As the throughput is a variable that can be modified by adjusting the size of the reactor, and therefore the distance between the flange and the bottom of the reactor, the precise distance would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed distance between the flange and the bottom of the reactor cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the size of reactor, and therefore the distance between the flange and the bottom of the reactor in the reaction apparatus of modified Christensen to obtain the desired throughput (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)).

Since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

Regarding limitations recited in claim 1 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP §2114 and 2115. Further, process limitations do not have a patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states “Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.

Regarding claim 8, the claimed orientation (horizontal) of the reaction apparatus does not distinguish the claimed invention over the prior art as changing the orientation of the apparatus would have been obvious to one of ordinary skill in the art to meet needs of installation space constraints. Furthermore, shifting the orientation of the apparatus does not change the operability of the apparatus and does not confer patentability (see MPEP §2144.04).

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 3,041,151) and Clyde (US 4,420,462) as applied to claim 1 above, and further in view of Keto et al. (US 3,732,517).

Regarding claim 3, Christensen, as discussed in claim 1 above, teaches a casing that is removable via bolts (47), but fails to teach an eyebolt fixing part for detachably engaging the outer casing to the reactor.

Keto discloses an apparatus that contains a removable fuse assembly from a casing.

Keto teaches an eyebolt (26) located at the top of the apparatus in order to facilitate separating the fuse assembly from the casing (col. 2 lines 51-53).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the eyebolt of Keto to the top of the reaction apparatus of Christensen in order to facilitate the separation of the casing from the reaction apparatus.

7. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 3,041,151) and Clyde (US 4,420,462) as applied to claim 1 above, and further in view of Serratore et al. (US 3,278,633).

Regarding claims 4 and 5, Christensen, as discussed in claim 1 above, teaches heat exchange between the reactor and the surrounding gas (see flow direction of untreated, gas past reaction chamber) and between the gas flowing in the double piping into and out of the reaction apparatus (see flows 49 and 51). Christensen, however, fails to teach fins located in the reactor and between the inner and outer pipes.

Serratore discloses a reaction apparatus with heat exchange between the components in the reaction apparatus.

Serratore teaches fins attached to heat exchange surfaces in order to increase heat exchange efficiency (col. 3 line 74 – col. 4 line 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the fins of Serratore to the reactor and the inner and outer pipes of Christensen in order to improve the heat exchange efficiency between process components.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US 3,041,151) and Clyde (US 4,420,462) as applied to claim 6 above, and further in view of Nakamura et al. (US 3,814,171).

Regarding claim 7, Christensen, as discussed in claim 6 above, discloses a preference for decreasing the temperature of a converted exiting gas as much as possible in the interest of recovering the maximum amount of heat from the converted gas (col. 1 line 59 – col. 2 line 27). One way of doing this is to use excess heat from the converted gas to heat a boiler and produce steam (col. 1 line 59 – col. 2 line 27). Christensen, however, fails to teach a radiating plate on the outer tube (exiting tube) of the double piping.

Nakamura also discloses an apparatus for maximizing heat transfer between two streams.

Nakamura teaches adding radiating plates to the outer surface of heat transfer tubes in order to promote heat exchange efficiency (see claim 3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the radiating plates of Nakamura, to the outer surface of the exiting gas tube of Christensen in order to promote heating exchange efficiency between the exiting gas and a boiler to maximize energy recovery and produce steam from the boiler, as mentioned in Christensen.

Response to Arguments

9. Applicant's arguments filed 6/5/09 have been considered but are moot in view of the new ground(s) of rejection necessitated by amendment.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. MERKLING whose telephone number is (571)272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. J. M./
Examiner, Art Unit 1795

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/Jennifer K. Michener/

Supervisory Patent Examiner, Art Unit 1795